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(54) Pushchair brake

(57) A pushchair brake comprises a lever 12 pivotally mounted on a hub 20 on which a wheel, and sprocket(s) 15, are rotatably mounted, the lever having a locking bar 14 arranged to engage with the sprocket(s) so as to lock the wheel. The lever is connected via a pair of cables to another lever on another wheel of the pushchair so that raising the first lever 12 causes the other lever on the other wheel to be raised, thus unlocking the wheels. Lowering the first lever 12 causes the other lever on the other wheel to be lowered, thus locking the wheels.

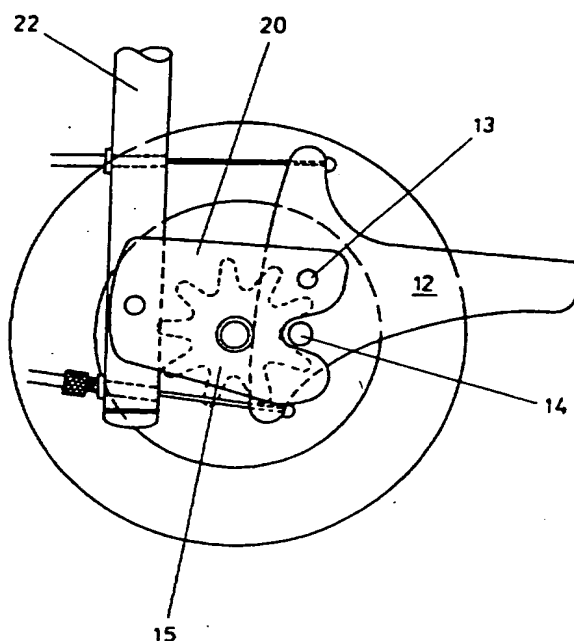


FIG. 2

GB 2 293 420 A

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1995

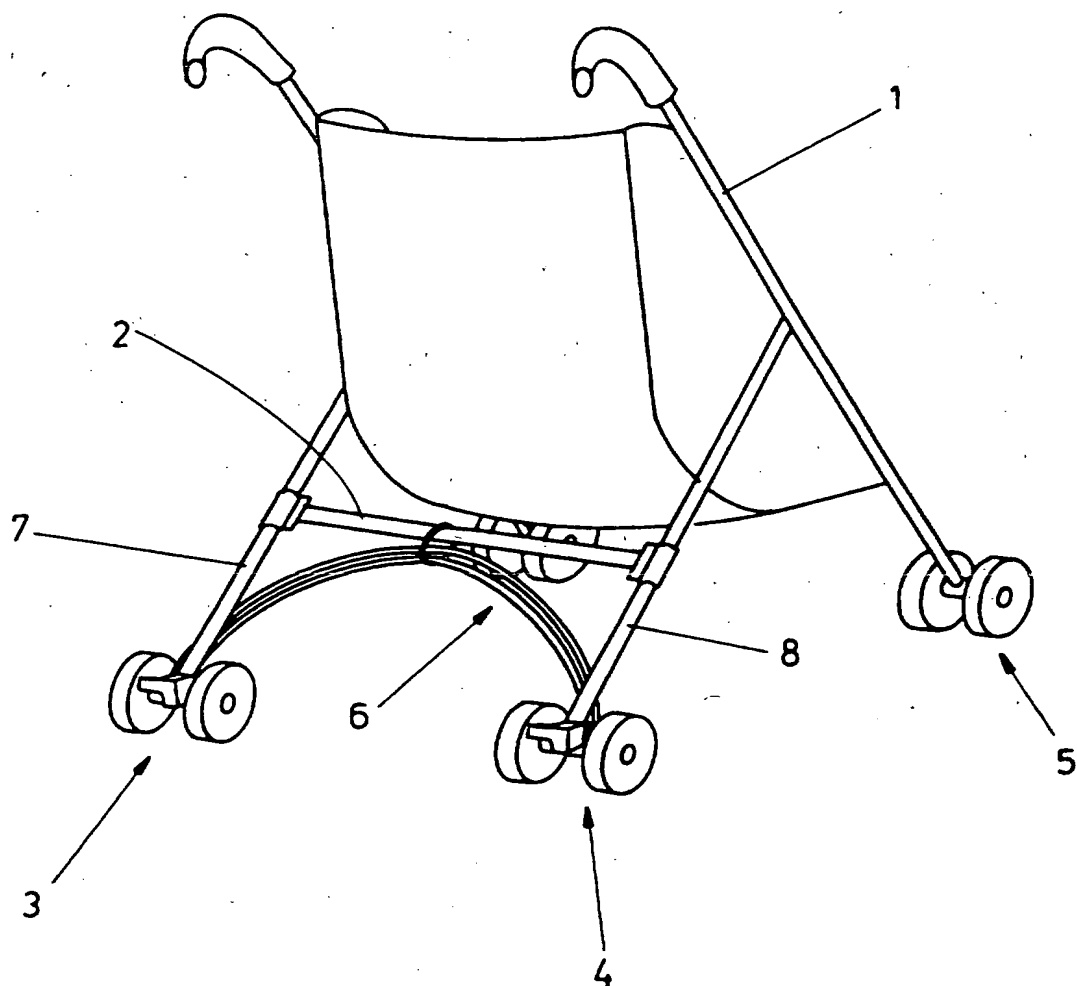


FIG. 1

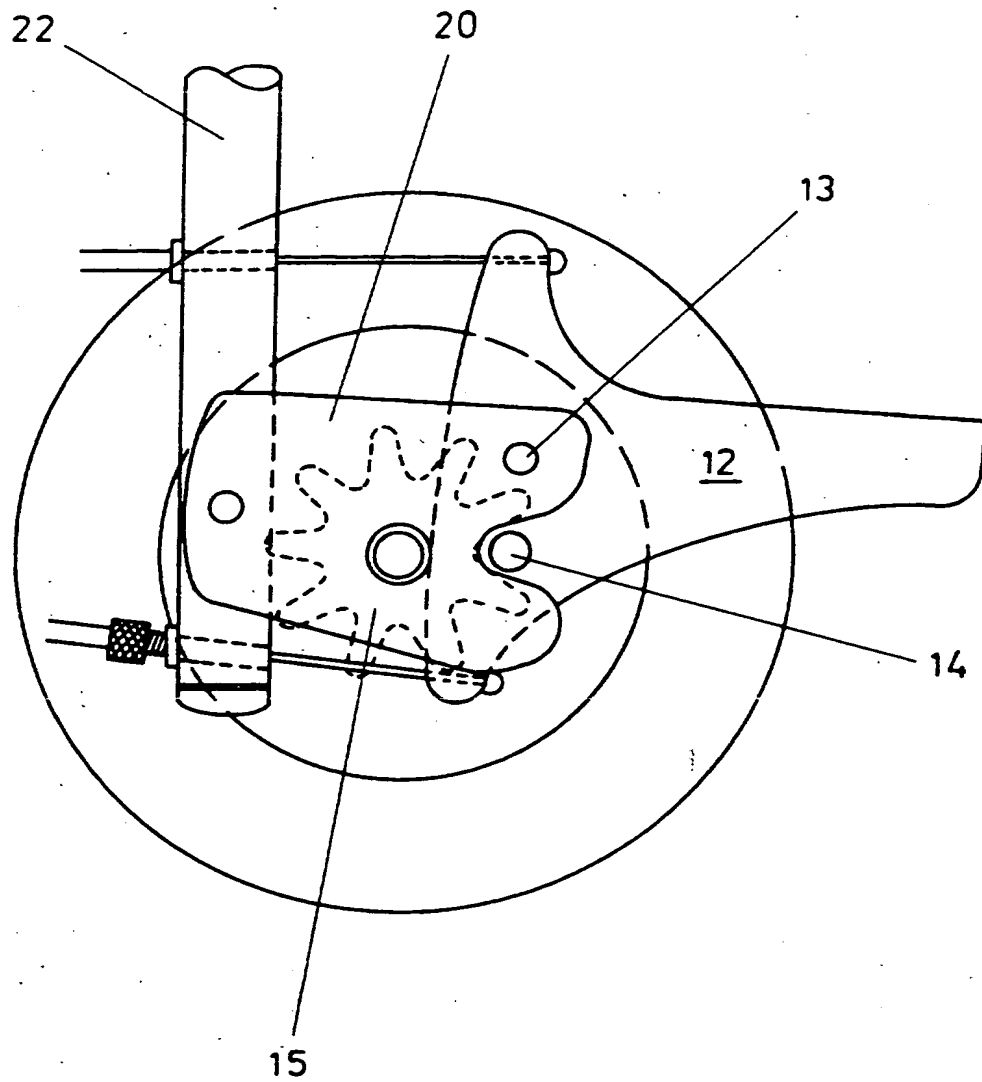


FIG. 2

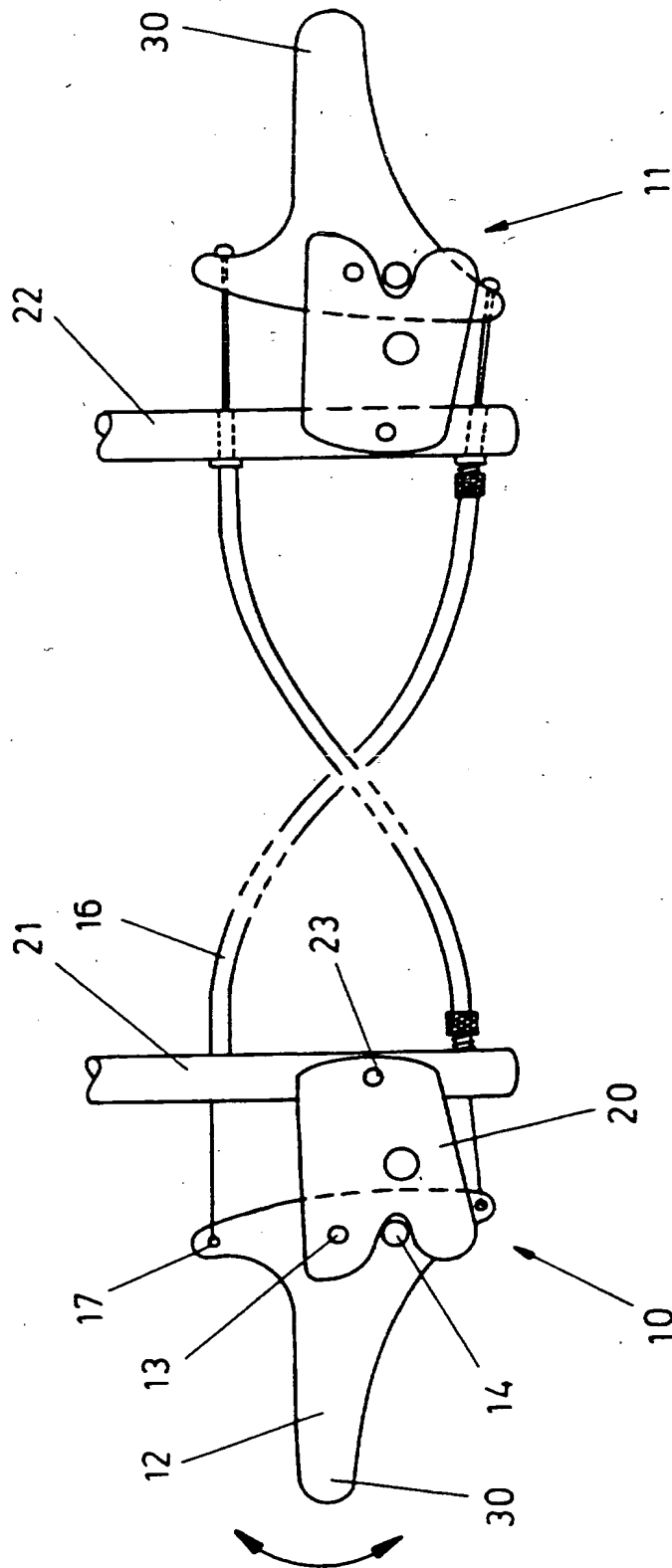


FIG. 3

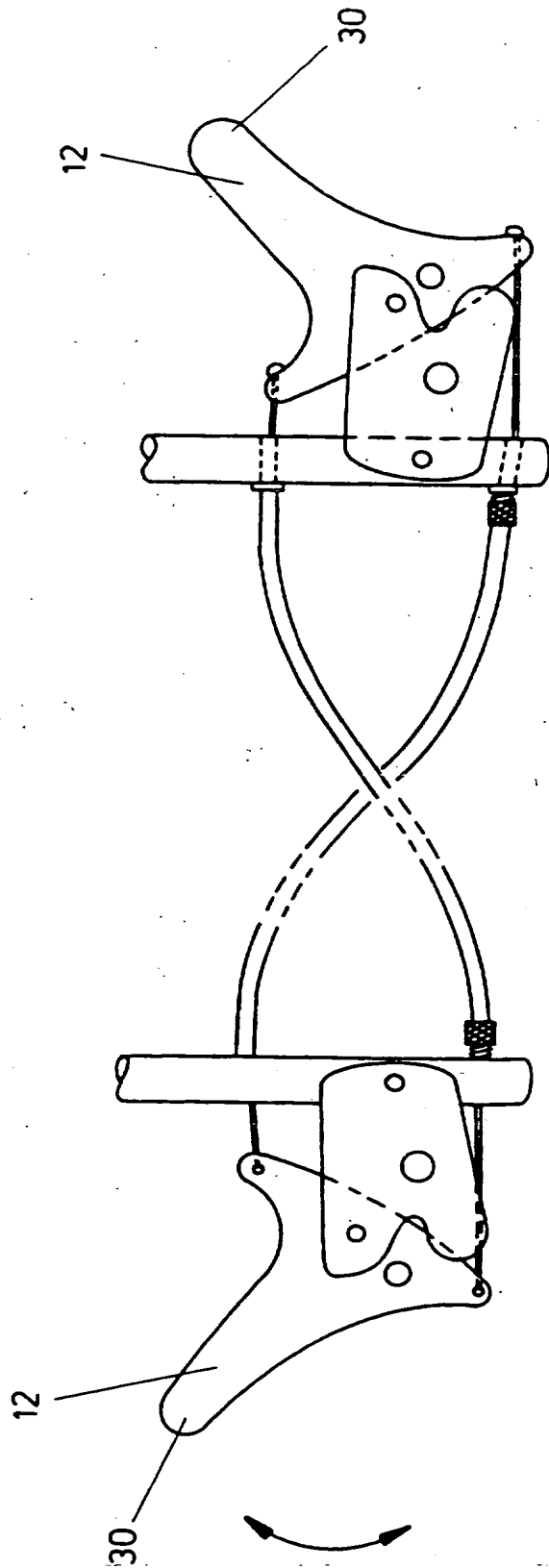


FIG. 4

PUSHCHAIR BRAKE

The present invention relates to the field of infant carriages, and particularly although not exclusively to a
5 braking mechanism for a baby pushchair.

Conventional collapsible push chairs for the transport of infants comprise a collapsible frame having four or more wheels spaced apart from each other and
10 located respectively at two forward locations and two rearward locations.

Another example of a braking mechanism for a conventional collapsible pushchair is found in GB 2 256
15 685 which discloses a braking mechanism for a collapsible pushchair in which two rearwardly trailing sets of wheels are interconnected by a slidably extendable and retractable linkage rod, such that by pressing the linkage rod, a first and second brake locking mechanism disposed
20 respectively at first and second rearward wheel positions, may be simultaneously activated, to lock the rear wheels.

However, the disclosure of GB 2 256 685B has the problem that over a period of time, the linkage mechanism
25 becomes worn and the friction between the sliding members of the linkage increases such that the linkage becomes a sticking point which prevents folding of the pushchair into a collapsed state. This is a problem in collapsing the chair in awkward situations, for example where a
30 mother needs to board a bus, and needs to collapse the chair before boarding the bus.

A conventional collapsible baby carriage having a braking mechanism is disclosed in GB 2 168 118. In this
35 disclosure, a baby carriage having a collapsible frame,

having four sets of wheels, each set of wheels spaced
apart from each other, is provided with a braking
mechanism on each of a first and a second rearwards
trailing wheel sets, a brake lever being provided on the
5 second rear wheel set, for activation of a brake connected
to the first and second wheel sets. The arrangement in GB
2 168 118 provides for activation of a brake on both rear
wheels from operation of a brake lever on a single rear
wheel. The brake on the second wheel is operated from the
10 first wheel via a cable.

However a complex return spring mechanism is required
on the first brake, in order to enable efficient release
of the first brake when the brake lever on the second
15 brake is lifted from a downward, braked position, to an
upward released position. This arrangement results in a
complicated mechanism having many components which adds to
the cost of manufacture and assembly, the mechanism is
prone to wear, and the cable is prone to stretching.
20

Specific embodiments of the present invention aim to
improve on the above prior art braking mechanisms for
collapsible carriages.

25 According to one aspect of the present invention
there is provided a braking mechanism for a collapsible
carriage, having wheels at first and second spaced apart
positions, the braking mechanism comprising:

30 a first brake for braking one or more wheels at the
first position;

a second brake for braking one or more wheels at the
second position; and
35

a connection means arranged to move one of the first or second brake into a locked condition, when the other one of the first or second brake is operated to a locked condition; and

5

a connection means arranged to move one of the first or second brake into an unlocked condition, when the other one of the first or second brake is operated to an unlocked condition.

10

The connection means preferably comprises a cable, for example one or more tension cables.

15 Preferably, a said cable comprises a tension cable, arranged to pull the first or second brake into a said locked or unlocked condition.

Preferably, a said cable comprises an outer sheath and an inner tension wire.

20

The connection means may comprise an hydraulic circuit, the first and second brakes being reciprocally operated one from the other, by way of hydraulic pressure transmitted through the hydraulic circuit. The hydraulic circuit may comprise a pair of hydraulic pipes, and a plunger arrangement.

25

Preferably, a said first and/or second brake comprises a rotatable toothed sprocket and means for preventing the sprocket from rotating.

30

Preferably, the sprocket is securely fixed to a wheel, so that engagement of the sprocket with the rotation preventions means stops the wheel from rotating.

35

Preferably, the means for preventing the sprocket from rotating, comprises a locking member which is moveable between a locked position in which the locking member engages the teeth of the sprocket, and an unlocked position, in which the locking member disengages the teeth. Preferably the locking member is movable in response to the first and/or second cables.

Preferably, there are provided cable tension adjustment means whereby the tension in the wire is adjustable. Suitably, the adjustment means alters the effective length of the outer sheath.

Preferably, the first and second cables are each passed through a leg of a frame to which a wheel is attached.

Preferably, the first tension cable is arranged to pull the first braking means into an unlocked condition when the second braking means is operated to an unlocked condition and the second tension cable is arranged to pull the first braking mechanism into a locked condition when the second braking mechanism is operated to a locked condition.

Preferably, the tension cables are arranged to transmit a locking force between the first and second brake means for locking one of the first or second brake means in response to a locking operation of the other one of the first or second brake means, and to transmit an unlocking force between the first and second brake means when one of the first or second brake means is operated to an unlocked condition.

Preferably, a first or second brake comprises:

a plurality of radially extending members arranged about an axis of rotation of a wheel member;

5 a lever member having a locking bar arranged substantially parallel to the axis of rotation, and movable towards or away from the axis of rotation and movable between adjacent ones of the radially extending protrusions or removable to a position outside the protrusions for locking, such that the locking bar may
10 prevent rotation of the radially extending protrusion when the locking bar is interposed between the protrusions, or may allow rotation of the protrusions when the locking bar is removed away from the protrusions.

15 Preferably, the lever is pivotally attached to the wheel, such that the lever is operable to move the locking bar between or away from the radially extending protrusions, the lever being pulled in a first, anticlockwise direction about the pivot by the first
20 cable, and being arranged to be pulled in a second, clockwise direction about the pivot by the second cable.

Preferably, the lever is operable to engage the locking bar with the radially extending member in response
25 to tensioning of the first cable, and is arranged to disengage from the radially extending members in response to a tensioning of the second cable member.

The invention includes a brake mechanism for a
30 collapsible carriage, the brake mechanism comprising first and second foot operated levers, each lever mounted at a rear wheel position of the carriage, the first and second levers being linked by a pair of cables in a reciprocal pulling or pushing arrangement, whereby on operation of
35 the first lever, the first lever is arranged to pull or

push the second lever in order that the second lever mimics the operation of the first lever, and on operation of the second lever, the second lever is arranged to pull or push the first lever to mimic the operation of the
5 second lever.

The invention includes a collapsible carriage having a braking mechanism according to the above aspect.

10 For a better understanding of the invention, and to show how embodiments of the same may be carried into effect, reference will now be made, by way of example, to the accompanying diagrammatic drawings, in which:

15 Figure 1 shows in perspective rear view, a collapsible baby carriage having a braking mechanism according to a first specific embodiment of the present invention;

20 Figure 2 shows in cut away view a wheel mounted brake comprising the first braking mechanism;

Figure 3 shows components comprising the first braking mechanism, in a braked condition; and
25

Figure 4 shows the components of Figure 3 in an unbraked condition.

Referring to Figure 1 of the accompanying drawings, a collapsible baby carriage comprises a collapsible frame 1 comprising first and second upright frame side members, being substantially "A" or "λ" shaped connected the first and second frame sides by one or more cross bars 2, and a foldable seat 10 being carried between the frame sides.
30 Each frame side comprises a forward and rearward leg, at
35

each lower end of which, is mounted one or more wheels or wheel sets. Each wheel set comprises a pair of wheels, so that the carriage has four wheel sets 3-6, and eight wheels in all.

5

A first and second wheel of each pair, is arranged to rotate together about a common axis of rotation at the lower end of the corresponding leg.

10

The frontwardly mounted wheel sets, 5, 6 are arranged to swivel about the lower ends of their respective corresponding legs, for steering the carriage, whereas the rearward wheel sets 3, 4 cannot steer, and each rotate about an axis of rotation which is fixed in relation to a length of the corresponding rear leg, 7, 8 respectively.

15

The rear wheel sets 3, 4 are provided with a first braking mechanism according to a first specific embodiment of the present invention.

20

Referring to Figures 2 and 3 of the accompanying drawings, there is shown schematically the first braking mechanism. The braking mechanism comprises first and second wheel mounted brakes shown generally at 10, 11.

25

Each wheel mounted brake comprises a lever 12 arranged to pivot around a pivot point 13, a locking bar 14 carried on the lever and arranged to lie substantially parallel to a main axis of rotation of the pair of wheels; one or more sprocket members 15 each comprising a plurality of radially extending teeth protrusions, each sprocket connected to a corresponding respective wheel. The sprockets may be formed in a plastics moulding, as part of the wheel. The sprockets are secured to the wheels, such that the sprocket and wheel rotate together,

35—

and preventing the sprocket from rotating will have the effect of locking the wheel. First and second tension cables 16, 16a are connected between the first and second wheel mounted brakes.

5

Each brake 10,11 is mounted on a respective wheel hub 20 attached to a lower end of the corresponding rearwardly trailing support arm 21 or 22 as appropriate. The hub comprises first and second plates arranged substantially parallel to each other, and rigidly fixed to the lower end of the corresponding trailing rear leg 21, or 22 as appropriate. Each hub is provided with a bearing 24, through which an axle passes, a said pair of wheels being connected to the axles, one wheel on each end of the axle. The wheels and the one or more sprockets 15 attached to the wheel(s), revolve around the axle. One sprocket is preferably provided each side of the hub. The locking bar 14, which extends substantially parallel to the axle and which extends laterally far enough to engage the teeth of the sprockets 15, is movable by pivoting the lever about the pivot point 13, to a depressed lever position, such that the locking bar may move from a locked position (as shown in Figures 2 and 3) in which the locking bar engages the teeth of the sprocket and in which the brake mechanism is in a braked condition, to an unlocked position, in which the locking bar is moved radially outwards from the axle out of the rotational path of the sprocket teeth to disengage the teeth, the braking mechanism being in an unbraked condition.

30

Each lever is provided with upper and lower anchorage points 17, 17a, 18, 18a as shown in figures 3 and 4 to which the first and second tension cables are connected to.

35

Each tension cable comprises a flexible sheath, and a flexible wire which runs through the centre of the sheath. The central wire of the first tension cable 16, is connected between the upper anchorage point of the first lever, and the lower anchorage point of the second lever, and passes through apertures in each of the rear legs. The sheath is positioned between the rear legs and abuts the rear legs near the apertures.

Each cable is preferably provided with a cable tensioner comprising a screw arrangement for lengthening or shortening the length of the sheath. Preferably the cable tensioner abuts the lower leg.

On each lever, the pivot point 13 is positioned between the upper and lower anchorage points. Pulling the upper anchorage point in a direction towards the lower end of the leg causes the lever to raise, and disengage the sprocket whilst pulling the lower anchorage point in a direction towards the lower end of the leg causes the lever to depress and the locking pin to engage the sprocket(s).

The brake mechanism is operated by a user of the carriage by depressing an outer end 30 of either one of the brake levers, by pushing the end of the brake lever with a foot to move the brake lever from the raised position in which the locking pin is disengaged from the sprocket, and the braking mechanism is unbraked, to a depressed position, in which the locking pin engages the sprocket, and the brake mechanism is in the braked condition. To unlock the brake, the outwardly extending end 30 of the brake lever is lifted by foot such that the lever swivels around the pivot point 13, and the locking

pin 14 is moved away from the axle to disengage the sprocket 15, and adopt the position as shown in Figure 4.

On depressing the first lever, to engage the braking mechanism to the braked condition the first wire is pulled with respect to the rear leg and sheath, so as to draw the lower anchorage point of the second lever towards the lower end of the leg to which that lever is attached, thus depressing the second lever also.

Raising the first lever to disengage the brake mechanism, to the unbraked condition causes the wire of the second tension cable, connected to the lower anchorage point of the first lever, to pull the upper anchorage point of the second lever, towards the second rear leg, thus raising the second lever.

Similarly, depressing or raising the second lever will, by pulling either the first or second cable as appropriate, cause the first lever to depress or raise in conformity with the second lever. The first and second levers are thus interconnected by the first and second tension cables, to raise or depress together, by operation of either one of the levers.

Figure 4 shows the braking mechanism in an unbraked condition, in which the levers 12 are in a raised position, and the locking pin 14 is disengaged from the sprockets 14.

Operation of either lever from the raised to the depressed position or vice versa, results in a corresponding movement of the other lever from the raised to depressed position or vice versa, since the levers are interlinked by the tension cables 16 as shown in Figure 4.

The specific embodiment of the present invention may have an advantage that the tension cables are flexible enough not to interfere with the normal collapsing of the baby carriage, whilst enabling a positive locking or
5 unlocking action of both rear wheels, by operation of either one of the brake levers. Further, as the tension cables are located through the left and right rear legs of the carriage, the cables are self locating, and manufacture of the braking mechanism is considerable
10 simplified and can be achieved at reduced cost.

Further, by the use of a reciprocating lever and cable mechanism, the need for complicated spring assemblies which are prone to spring breakage, wear, and
15 stretch, is avoided. Thus, reliability and safety may be improved.

The reader's attention is directed to all papers and documents which are filed concurrently with or previous to
20 this specification in connection with this application and which are open to public inspection with this specification, and the contents of all such papers and documents are incorporated herein by reference.

25 All of the features disclosed in this specification (including any accompanying claims, abstract and drawings), and/or all of the steps of any method or process so disclosed, may be combined in any combination, except combinations where at least some of such features
30 and/or steps are mutually exclusive.

Each feature disclosed in this specification (including any accompanying claims, abstract and drawings), may be replaced by alternative features serving
35 the same, equivalent or similar purpose, unless expressly

stated otherwise. Thus, unless expressly stated otherwise, each feature disclosed is one example only of a generic series of equivalent or similar features.

- 5 The invention is not restricted to the details of the foregoing embodiment(s). The invention extends to any novel one, or any novel combination, of the features disclosed in this specification (including any accompanying claims, abstract and drawings), or to any
10 novel one, or any novel combination, of the steps of any method or process so disclosed.

CLAIMS

1. A braking mechanism for a collapsible carriage,
having wheels at first and second spaced apart positions,
5 the braking mechanism comprising:

a first brake for braking one or more wheels at the
first position;

10 a second brake for braking one or more wheels at the
second position;

a first connection means arranged to move one of the
first or second brake into a locked condition, when the
15 other one of the first or second brake is operated to a
locked condition; and

a second connection means arranged to move one of the
first or second brake into an unlocked condition, when the
20 other one of the first or second brake is operated to an
unlocked condition.

2. A braking mechanism according to claim 1, wherein a
said connection means comprises one or more tension
25 cables, arranged to pull the first or second brake into a
said locked or unlocked condition.

3. A braking mechanism according to claim 2, wherein a
said cable comprises an outer sheath and an inner tension
30 wire.

4. A braking mechanism according to claim 3, wherein the
tension in the wire is adjustable by use of an adjustment
means.

5. A braking mechanism according to claim 4, in which the adjustment means operates to alter the effective length of the outer sheath.
- 5 6. A braking mechanism according to any one of the preceding claims, in which the carriage has a frame, and the first and second cables are each passed through a leg of the frame, to which leg a wheel is attached.
- 10 7. A braking mechanism according to any one of the preceding claims, in which the first tension cable is arranged to pull the first brake into an unlocked condition when the second brake is operated to an unlocked condition and the second tension cable is arranged to pull
15 the first brake into a locked condition when the second brake is operated to a locked condition.
8. A braking mechanism according to claim 7, in which the tension cables are arranged to transmit a locking
20 force between the first and second brakes for locking one of the first or second brakes in response to a locking operation of the other one of the first or second brakes, and to transmit an unlocking force between the first and second brakes when one of the first or second brakes is
25 operated to an unlocked condition.
9. A braking mechanism according to any one of the preceding claims in which a said brake comprises a rotatable toothed sprocket and a means for preventing the
30 sprocket from rotating.
10. A braking mechanism according to claim 9, wherein said sprocket is securely fixed to a said wheel, such that engagement of the sprocket with the means for preventing
35 the sprocket from rotating, stops the wheel rotating.

11. A braking mechanism according to claim 9 or 10, wherein the means for preventing the sprocket from rotating comprises a locking member which is moveable between a locked position in which the locking member engages the teeth of the sprocket, and an unlocked position in which the locking member disengages the teeth.

12. A braking mechanism according to claim 11, in which the locking member is moveable in response to the first and/or second connection means.

13. A braking mechanism according to any one of the preceding claims, wherein a said first or second brake comprises:

15 a plurality of radially extending members arranged about an axis of rotation of a wheel member;

20 a lever member having a locking bar arranged substantially parallel to the axis of rotation, the locking bar being movable towards or away from the axis of rotation and movable between adjacent ones of the radially extending protrusions or removable to a position outside the protrusions, such that the locking bar may prevent rotation of the radially extending protrusion when the locking bar is interposed between the protrusions, or may allow rotation of the protrusions when the locking bar is removed away from the protrusions.

30 14. A brake mechanism according to claim 13 as appendant to any one of claims 2 to 5, in which the lever is pivotally attached, such that the lever is operable to move the locking bar between or away from the radially extending protrusions, the lever being pulled in a first, anticlockwise direction about the pivot by the first

cable, and being arranged to be pulled in a second, clockwise direction about the pivot by the second cable.

5 15. A braking mechanism according to claim 13, in which the lever is operable to engage the locking bar with the radially extending members in response to tensioning of the first cable, and is arranged to disengage from the radially extending members in response to a tensioning of the second cable.

10 16. A brake mechanism for a collapsible carriage, the brake mechanism comprising first and second foot operated levers, each lever mounted at a rear wheel position of the carriage, the first and second levers being linked by a
15 pair of cables in a reciprocal pulling or pushing arrangement, whereby on operation of the first lever, the first lever is arranged to pull or push the second lever in order that the second lever mimics the operation of the first lever, and on operation of the second lever, the
20 second lever is arranged to pull or push the first lever to mimic the operation of the second lever.

25 17. A braking mechanism, substantially as described herein with reference to the accompany drawings.

18. A collapsible carriage having a braking mechanism as claimed hereinabove.

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| Relevant Technical Fields (i) UK Cl (Ed.N) F2E (ES), F2K (K2) (ii) Int Cl (Ed.6) B62B 5/04, 9/08 Databases (see below) (i) UK Patent Office collections of GB, EP, WO and US patent specifications. (ii) ONLINE: EDOC, WPI | Search Examiner PETER SQUIRE |
| | Date of completion of Search 29 AUGUST 1995 |
| | Documents considered relevant following a search in respect of Claims :- 1-18 |

Categories of documents

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| Category | Identity of document and relevant passages | Relevant to claim(s) |
|----------|---|----------------------|
| E,X | GB 2281110 A (KIRKMOSS) see Figures 5 and 6 | 1-3, 7, 8, 16, 18 |

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